WHAT IS CLAIMED IS:

1. A gas-circulating processing apparatus which comprises:

a processing chamber in which processing is performed;

a gas supply piping communicated with a processing gas source;

a first exhaust mechanism discharging a gas from said processing chamber;

a second exhaust mechanism discharging a portion of the gas discharged from said first exhaust mechanism;

a back pressure adjusting mechanism interposed between said first exhaust mechanism and said second exhaust mechanism to adjust a back pressure of said first exhaust mechanism;

a gas circulating piping which is configured to combine another portion of the gas that has been discharged from said first exhaust mechanism with a processing gas supplied from said gas supply piping; and

a gas feeding piping connected with a confluence zone where the processing gas from said gas supply piping is combined with the gas from said gas circulating piping to form a confluent gas, said gas feeding piping functioning to introduce said confluent gas into said processing chamber and having a larger

inner diameter than that of said gas supply piping in the vicinity of said confluence zone.

2. The gas-circulating processing apparatus according to claim 1, wherein the inner diameter of said gas feeding piping is at least 1.5 times as large as that of said gas supply piping.

3. The gas-circulating processing apparatus according to claim 1, wherein a conductance of said gas feeding piping is larger than that of said gas supply piping.

4. The gas-circulating processing apparatus according to claim 1, wherein the inner diameter of said gas circulating piping is larger than that of said gas supply piping in the vicinity of said confluence zone.

5. The gas-circulating processing apparatus according to claim 4, wherein the inner diameter of said gas circulating piping is at least 1.5 times as large as that of said gas supply piping.

6. The gas-circulating processing apparatus according to claim 4, wherein a conductance of said gas circulating piping is larger than that of said gas supply piping.

7. A gas-circulating processing apparatus which comprises:

a processing chamber in which processing is performed by making use of an activated gas obtained by

activating a processing gas;

a gas feeding piping introducing said processing gas into said processing chamber;

a first exhaust mechanism discharging a gas from said processing chamber;

a first gas supply piping feeding said processing gas to said first exhaust mechanism;

a second exhaust mechanism discharging a portion of the gas discharged from said first exhaust mechanism;

a back pressure adjusting mechanism interposed between said first exhaust mechanism and said second exhaust mechanism to adjust a back pressure of said first exhaust mechanism; and

a gas circulating piping connected with said gas feeding piping to feed the processing gas supplied from said first gas supply piping as well as another portion of the gas discharged from said first exhaust mechanism to said processing chamber through said gas feeding piping.

8. The gas-circulating processing apparatus according to claim 7, which further comprises a second gas supply piping connected with said gas feeding piping to feed said processing gas to said processing chamber, the processing gas from said first gas supply piping, part of the gas discharged from said first exhaust mechanism, and the processing gas from said

second gas supply piping are introduced into said processing chamber.

9. The gas-circulating processing apparatus according to claim 8, wherein said first gas supply piping is branched from said second gas supply piping.

10. A gas-circulating processing method comprising feeding a processing gas to a gas-circulating processing apparatus which comprises:

a processing chamber in which processing is performed by making use of an activated gas obtained by activating a processing gas;

a gas feeding piping introducing said processing gas into said processing chamber;

a first exhaust mechanism discharging a gas from said processing chamber;

a second exhaust mechanism discharging a portion of the gas discharged from said first exhaust mechanism;

a back pressure adjusting mechanism interposed between said first exhaust mechanism and said second exhaust mechanism to adjust a back pressure of said first exhaust mechanism; and

a gas circulating piping connected with said gas feeding piping to feed another portion of the gas discharged from said first exhaust mechanism to said processing chamber through said gas feeding piping,

wherein said processing gas is supplied to said

first exhaust mechanism, thereby purging the gas in said first exhaust mechanism, and parts of the processing gas and the purged gas are introduced into said processing chamber through said gas circulating piping and said gas feeding piping.

11. The method according to claim 10, wherein said gas-circulating processing apparatus further comprises a gas supply piping connected with said gas feeding piping to feed said processing gas to said processing chamber, and the processing gas from said gas supply piping is introduced into said processing chamber through said gas feeding piping, and the parts of the processing gas and the purged gas in said first exhaust mechanism are introduced into said processing chamber through said gas circulating piping and said gas feeding piping.

12. The method according to claim 10, wherein said processing chamber is a film-forming chamber of CVD apparatus and said processing is film forming.

13. The method according to claim 10, wherein said processing chamber is a film-forming chamber of CVD apparatus and said processing is cleaning in said film-forming chamber.

14. The gas-circulating processing method according to claim 10, wherein said processing chamber is an etching chamber of etching apparatus and said processing is etching.

15. A gas-circulating processing apparatus which comprises:

a processing chamber in which processing is performed;

a first exhaust mechanism discharging a gas from said processing chamber;

a second exhaust mechanism discharging a portion of the gas discharged from said first exhaust mechanism through an exhaust piping interposed therebetween;

a back pressure adjusting mechanism interposed between said first exhaust mechanism and said second exhaust mechanism to adjust a back pressure of said first exhaust mechanism;

a gas circulating piping feeding another portion of the gas discharged from said first exhaust mechanism to said processing chamber; and

a first heater heating at least part of a circulating route extending from said processing chamber through said first exhaust mechanism and said gas circulating piping to said processing chamber.

16. The gas-circulating processing apparatus according to claim 15, wherein at least part of said circulating route is heated by means of said first heater to a temperature of not lower than 60℃.

17. The gas-circulating processing apparatus according to claim 15, wherein at least part of said circulating route is heated by means of said first

heater to a temperature of not higher than 100℃.

18. The gas-circulating processing apparatus according to claim 15, which further comprises a second heater heating said back pressure adjusting mechanism and said exhaust piping.

19. The gas-circulating processing apparatus according to claim 15, which further comprises a first valve at a portion of said circulating piping, which is located in the vicinity of a position where said exhaust piping is branched.

20. The gas-circulating processing apparatus according to claim 15, which further comprises a second valve at a portion of said circulating piping, which is located on the downstream side of said first valve.